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Nursing Procedures

SIXTH EDITION

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Documentation

Record the time and date of transfer, the patient's condition during transfer, the name of the receiving unit, and the means of transportation. Include equipment accompanying the patient, such as IV lines and pumps, surgical drains, and oxygen therapy. Note the name and title of the person you gave your report to; also include the names of staff or family members accompanying the patient.

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TRANSFUSION OF BLOOD AND BLOOD PRODUCTS

The transfusion of blood and blood products should be performed only as a last resort in patients with chronic anemia or acute bleeding. Prevention and early diagnosis of anemia or bleeding can help minimize the need for transfusion of blood and blood products. For a patient with chronic anemia, the use of iron and vitamin supplements is often sufficient to raise the hemoglobin level enough so a transfusion isn't required.

If the patient is experiencing acute bleeding, the first line of treatment should be IV fluids, such as crystalloids or colloids, to help increase the circulating volume. If the patient requires a blood transfusion, it's very important to make sure that the right patient is receiving the right blood or blood product. If a patient receives the wrong blood or blood product, it could cause a serious reaction and possibly death. Before administering blood or a blood product, you should be familiar with the different types of blood and blood products (See *Transfusing blood and selected blood products.*)

Equipment

Blood or blood component administration set as appropriate • IV pole • gloves • blood or blood product • 10-mL syringe • 250 mL of normal saline solution • IV catheter equipment, if necessary (should include 14G to 24G catheter).[3]

Straight line and Y-type blood administration sets (Y-type is most commonly used) contain a standard blood filter designed to eliminate blood clots and cellular debris that occur during blood storage. A standard blood filter will trap particles that are 170 microns or larger. There are times, however, when a specialized blood filter may be required. (See *Specialized blood filters,* page 745.)

Preparation of equipment

Avoid obtaining the blood or blood product until you're ready to begin the transfusion. The transfusion should begin within 30 minutes of obtaining the blood or blood product *to decrease the risk of bacterial growth.*[3] Prepare the equipment when you're ready to start the infusion.

CONTINGENCY *Never store blood in a non–blood bank refrigerator. Return the blood to the blood bank refrigerator if a delay of 30 minutes or more is anticipated.*[3,4]

Implementation

- Make sure that a written order is in the patient's medical record. Confirm that the order and the medical record are labeled with the patient's name and assigned identification number.[3,5]
- Verify that the patient or his legally authorized representative has signed an informed consent form before transfusion therapy is initiated and that the form is in the patient's medical record according to your facility's policy.[6,7] Some facilities don't require consent for blood components such as albumin; make sure you're familiar with your facility's policy.
- Ensure that the indication for the transfusion is documented in the patient's medical record.
- Gather the equipment.
- Confirm the patient's identity using at least two patient identifiers according to your facility's policy.[8]
- Explain the procedure to the patient.
- Perform hand hygiene and put on gloves.[2]
- If the patient doesn't have an IV catheter in place, insert one. Use a catheter that's 24G or larger in diameter.[3] The selection of the catheter size depends on the location, size, and integrity of the patient's veins. A smaller catheter usually requires a slower rate of transfusion. (See "IV catheter insertion and removal," page 421.)

Transfusing blood and selected blood products

BLOOD COMPONENT	INDICATIONS	COMPATIBILITY	NURSING CONSIDERATIONS
Packed red blood cells (RBCs) Same RBC mass as whole blood but with 80% of the plasma removed	▪ To restore or maintain oxygen carrying capacity ▪ To correct anemia and surgical blood loss ▪ To increase RBC mass ▪ For red cell exchange	▪ Group A receives A or O ▪ Group B receives B or O ▪ Group AB receives AB, A, B, or O ▪ Group O receives O ▪ Rh type must match	▪ Use blood administration tubing to infuse within 4 hours. ▪ Use only with normal saline solution. ▪ Avoid administering packed RBCs for anemic conditions correctable by nutritional or drug therapy.
Leukocyte-poor RBCs Same as packed RBCs with about 70% of the leukocytes removed	▪ Same as packed RBCs ▪ To prevent febrile reactions from leukocyte antibodies ▪ To treat immunocompromised patients ▪ To restore RBCs to patients who have had two or more nonhemolytic febrile reactions	▪ Same as packed RBCs ▪ Rh type must match	▪ Use blood administration tubing. ▪ May require a 40-micron filter suitable for hard-spun, leukocyte-poor RBCs. ▪ Use only with normal saline solution. ▪ Cells expire 24 hours after washing.
Platelets Platelet sediment from RBCs or plasma platelets	▪ To treat bleeding caused by decreased circulating platelets or functionally abnormal platelets ▪ To improve platelet count preoperatively in a patient whose count is 50,000/μL or less	▪ ABO compatibility identical; Rh-negative recipients should receive Rh-negative platelets	▪ Use a blood filter or leukocyte-reduction filter. ▪ As prescribed, premedicate with antipyretics and antihistamines if the patient's history includes a platelet transfusion reaction or to reduce chills, fever, and allergic reactions. ▪ Complete transfusion within 20 minutes or at the fastest rate the patient can tolerate. ▪ Use single-donor platelets if the patient has a need for repeated transfusions. ▪ Platelets aren't used to treat autoimmune thrombocytopenia or thrombocytopenic purpura unless patient has a life-threatening hemorrhage.
Fresh frozen plasma (FFP) Uncoagulated plasma separated from RBCs and rich in coagulation factors V, VIII, and IX	▪ To correct a coagulation factor deficiency ▪ To replace a specific factor when that factor isn't available ▪ For warfarin reversal ▪ To treat thrombotic thrombocytopenic purpura	▪ ABO compatibility required ▪ Rh match not required	▪ Use a blood administration set. ▪ Complete the transfusion within 20 minutes or at the fastest rate the patient can tolerate. ▪ Keep in mind that large-volume transfusions of FFP may require correction for hypocalcemia because the citric acid in FFP binds calcium. ▪ Must be infused within 6 hours of being thawed.

(continued)

Transfusing blood and selected blood products *(continued)*

BLOOD COMPONENT	INDICATIONS	COMPATIBILITY	NURSING CONSIDERATIONS
Albumin 5% (buffered saline); albumin 25% (salt-poor) A small plasma protein prepared by fractionating pooled plasma	▪ To replace volume lost because of shock from burns, trauma, surgery, or infections ▪ To treat hypoproteinemia (with or without edema)	▪ Not required	▪ Use the administration set supplied by the manufacturer and set the rate based on the patient's condition and response. ▪ Keep in mind that albumin is contraindicated in severe anemia. ▪ Administer cautiously in cardiac and pulmonary disease *because heart failure may result from circulatory overload.*
Factor VIII concentrate (antihemophilic factor) Cold insoluble portion of plasma recovered from FFP	▪ To treat a patient with hemophilia A ▪ To treat a patient with von Willebrand's disease	▪ ABO compatibility not required	▪ Administer by IV injection using a filter needle, or use the administration set supplied by the manufacturer.
Cryoprecipitate Insoluble plasma portion of FFP containing fibrinogen, factor VIIIc, factor VIIvWF, factor XIII, and fibronectin	▪ To treat factor VIII deficiency and fibrinogen disorders ▪ To treat significant factor XIII deficiency	▪ ABO compatibility required[1] ▪ Rh match not required[1,2]	▪ Administer with a blood administration set. ▪ Add normal saline solution to each bag of cryoprecipitate, as necessary, *to facilitate infusion.* ▪ Keep in mind that cryoprecipitate must be administered within 6 hours of thawing. ▪ Before administration, check laboratory studies to confirm a deficiency of one of the specific clotting factors present in cryoprecipitate. ▪ Be aware that patients with hemophilia A or von Willebrand's disease should only be treated with cryoprecipitate when appropriate factor VIII concentrates aren't available.

If an existing IV catheter is in place, verify it's an appropriate size and that it's patent by using a 10-mL syringe to aspirate for blood return. Central venous access devices also may be used for transfusion therapy.

▪ Record the patient's baseline vital signs.

▪ Obtain the blood or blood product from the blood bank. Check the expiration date on the blood bag, and observe for abnormal color, red blood cell (RBC) clumping, gas bubbles, and extraneous material. Return outdated or abnormal blood to the blood bank.

▪ Use a two-person verification process to match the blood or blood component to the doctor's order and to match the patient to the blood component. One of the individuals conducting the verification must be the qualified person, usually a registered nurse, who will administer the blood or blood component to the patient. The second individual conducting the verification must be qualified to participate in the process as determined by your facility's policy.[1]

▪ Compare the name and identification number on the patient's wristband with those on the blood bag label. Check the blood bag identification number, ABO blood group, and Rh compatibility. Also, compare the patient's blood bank identification number with the number on the blood bag.[1]

▪ When using a Y-type set, close all the clamps on the set. Insert the spike of the line you're using for the normal saline solution into the bag of saline solution. Next, open the port on the blood bag, and insert the spike of the line you're using to administer the blood or blood product into the port. Hang the bag of normal saline solution and blood or blood product on the IV pole, open the clamp on the line of saline solution, and squeeze the

drip chamber until it's half full. Then remove the adapter cover at the tip of the blood administration set, open the main flow clamp, prime the tubing with saline solution, and then close the clamp.

- If necessary, when administering packed RBCs with a Y-type set, you can add saline solution to the bag to dilute the cells by closing the clamp between the patient and the drip chamber and opening the clamp from the blood. Then lower the blood bag below the saline container and let 30 to 50 mL of saline solution flow into the packed cells. Finally, close the clamp to the blood bag, rehang the bag, rotate it gently *to mix the cells and saline solution*, and close the clamp to the saline container.
- Thoroughly disinfect the port of the venous access device with a disinfectant pad using friction.
- Trace the blood administration set tubing from the patient to its point of origin, and then attach it to the venous access device, open the clamp, and flush it with normal saline solution.[12] Then close the clamp to the saline solution and open the clamp between the blood bag and the patient.

CONTINUED *When administering blood, never mix or administer simultaneously any other IV solution except normal saline solution,[3] which is isotonic and calcium-free. Calcium will bind with the citrate anticoagulant in the blood bag and promote clotting in the tubing. Excess glucose causes hemolysis and shortens RBC survival. Also, a blood administration set shouldn't be piggybacked into a main line that has been used for any solution other than normal saline solution.*

- Monitor the patient closely and adjust the flow rate to no greater than 2 mL/minute for the first 15 minutes of the transfusion *to observe for a possible transfusion reaction.*[3] If such signs develop, record vital signs and stop the transfusion. Infuse saline solution at a keep-vein-open rate, and notify the doctor immediately. Report the transfusion reaction according to your facility's policy. (See "Transfusion reaction management," page 747.) If no signs of a reaction appear within 15 minutes, you'll need to adjust the flow clamp to the ordered infusion rate. The rate of infusion should be as rapid as the patient's circulatory system can tolerate. It's undesirable for blood products to remain at room temperature for more than 4 hours.[3] If the infusion rate must be so slow that the entire unit can't be infused within 4 hours, it may be appropriate for the blood bank to divide the unit and keep one portion refrigerated until it can be safely administered.
- Remove and discard your gloves and perform hand hygiene.[4]
- Recheck the patient's vital signs, including temperature, every 15 minutes for the first 30 minutes after beginning the infusion, and then according to facility policy.[3]
- Perform hand hygiene and put on gloves.[4]
- After completing the transfusion, flush the administration set and IV catheter with the normal saline solution.
- Using sterile technique, remove and discard the used infusion equipment. If additional units are being given, repeat the procedure. Otherwise, as indicated, reconnect the original IV fluid, saline lock the site, or discontinue the IV infusion.

EQUIPMENT

Specialized blood filters

When deemed medically necessary, specialized filters are used to transfuse blood and blood products.[3]

FILTER TYPE	CONSIDERATIONS
Microaggregate filter	Commonly used during large-volume replacement in massive trauma Used to filter degenerating platelets, leukocytes, and fibrin strands that can develop in blood units stored for 5 or more days Use isn't warranted in routine transfusion therapy Eliminates debris as small as 20 microns
Leucocyte-reduction filter	Used to prevent febrile nonhemolytic reactions May be used to reduce the risk of cytomegalovirus transmission Reduces the number of leukocytes by 99.9% in red blood cell and platelet units

- Discard the blood bag, tubing and filter in the appropriate hazardous waste container.
- Remove and discard your gloves and perform hand hygiene.[4]
- Record the patient's vital signs.
- Document the procedure.[2,3]

Special considerations

- If necessary, using sterile technique, change the blood or blood component administration set after each unit is infused or after 4 hours. Change it immediately if contamination is suspected or the integrity of the product or system has been compromised.[3]
- Change the filter whenever you change the tubing unless otherwise indicated by a manufacturer's labeled use and directions.[3]
- Use a blood warmer, as ordered, in special situations, such as when transfusing multiple units of refrigerated blood to a patient with a large volume of blood loss, performing exchange transfusions, or transfusing to a patient with cold agglutinin disease. Always follow the manufacturer's instructions.[3]
- For rapid blood replacement, you may need to use a pressure bag or a positive pressure electronic infusion device. Always follow the manufacturer's instructions for use. Pressure bags should be equipped with a pressure gauge and exert uniform pressure. Be aware that excessive pressure may develop, leading to broken blood vessels and extravasation, with hematoma and hemolysis of the infusing RBCs.

Documenting blood transfusions

After matching the patient's name, medical record number, blood group (or type) and Rh factor (the patient's and the donor's), the crossmatch data, and the blood bank identification number with the label on the blood bag, you'll need to clearly document that you did so. The blood or blood component must be identified and documented properly by two health care professionals as well.

On the transfusion record, document:

- the date and time the transfusion was started and completed
- the name of the health care professional who verified the information
- the type and gauge of the catheter
- the total amount of the transfusion
- the patient's vital signs before and after the transfusion
- any infusion device used
- the flow rate and if any blood warming unit used.

If the patient receives his own blood, document in the intake and output records:

- the amount of autologous blood retrieved
- the amount reinfused in the intake and output records
- laboratory data during and after the autotransfusion
- the patient's pretransfusion and posttransfusion vital signs.

Pay particular attention to:

- the patient's coagulation profile
- hemoglobin and hematocrit values and arterial blood gas and calcium levels
- the patient's tolerance of the procedure, especially fluid status.

- If the transfusion stops, take the following steps as needed: Check that the IV container is at least 3' (1 m) above the level of the IV site. Make sure that the flow clamp is open and that the blood completely covers the filter. If it doesn't, squeeze the drip chamber until it does. Gently rock the bag back and forth, agitating any blood cells that may have settled. Untape the dressing over the IV site to check catheter placement. Reposition the catheter if necessary. Flush the line with saline solution, aspirate for blood return, and restart the transfusion. When using a Y-type set, close the flow clamp to the patient and lower the blood bag. Next, open the saline clamp and allow some saline solution to flow into the blood bag. Rehang the blood bag, open the flow clamp to the patient, and reset the flow rate.
- If a hematoma develops at the IV site, immediately stop the infusion. Remove the IV cannula. Notify the doctor and expect to place ice on the site intermittently for 8 hours and then apply warm compresses. Follow your facility's policy.
- If the blood bag empties before the next one arrives, administer normal saline solution slowly. If you're using a Y-type set, close the blood-line clamp, open the saline clamp, and let the saline run slowly until the new blood arrives. Decrease the flow rate or clamp the line before attaching the new unit of blood.
- Keep in mind that blood products must be infused within 4 hours of removal from the blood bank refrigerator.[2,3] If any blood product remains after 4 hours, discontinue the infusion and discard the remaining product in the hazardous waste container in the patient's room *to prevent accidental exposure.*
- Monitor the patient's intake and output and lung status and watch for edema *to prevent fluid overload.*
- Be aware that whole blood is rarely used. It may be used on rare occasions to restore blood volume from hemorrhage or in an exchange transfusion.
- If the patient is a Jehovah's Witness, special written permission from him is required for a transfusion.

Complications

Despite improvements in crossmatching precautions, transfusion reactions can still occur during a transfusion or within 96 hours after a transfusion. Transfusion reactions typically stem from a major antigen-antibody reaction. The nurse must closely monitor for signs and symptoms, especially if the patient can't report the symptoms. A transfusion reaction requires prompt nursing action *to prevent further complications and, possibly, death.*

Unlike a transfusion reaction, an infectious disease transmitted during a transfusion may go undetected until days, weeks, or even months later, when it produces signs and symptoms. Measures to prevent disease transmission include laboratory testing of blood products and careful screening of potential donors, neither of which is guaranteed.

Hepatitis C accounts for most posttransfusion hepatitis cases. The tests that detect hepatitis B and hepatitis C can produce false-negative results and may allow some hepatitis cases to go undetected.

When testing for antibodies to human immunodeficiency virus (HIV), keep in mind that antibodies don't appear until 6 to 12 weeks after exposure. The American Association of Blood Banks estimates the risk of acquiring HIV from a single blood transfusion is between 1 in 40,000 to 1 in 153,000.

Many blood banks screen blood for cytomegalovirus (CMV). Blood with CMV is especially dangerous for an immunosuppressed, seronegative patient. Blood banks also test blood for syphilis, but refrigerating blood virtually eliminates the risk of transfusion-related syphilis.

Circulatory overload and hemolytic, allergic, febrile, and pyogenic reactions can result from any transfusion. Coagulation disturbances, citrate intoxication, hyperkalemia, acid-base imbalance, loss of 2,3-diphosphoglycerate, ammonia intoxication, and hypothermia can result from massive transfusion.

Documentation

Record the date and time of the transfusion, that informed consent was obtained, the indications for the transfusion, the type and amount of transfusion product, the amount of normal saline solution, the patient's vital signs, your check of all identification data, and the patient's response. Document any transfusion reaction and treatment provided. Note any patient teaching and the patient's understanding of your teaching. (See *Documenting blood transfusions.*)

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TRANSFUSION REACTION MANAGEMENT

A transfusion reaction typically stems from a major antigen-antibody reaction and can result from a single or massive transfusion of blood or blood products. It's estimated that 1% to 2% of all patients who receive a transfusion of blood or blood products experience a transfusion reaction. Although many reactions occur during transfusion or within 96 hours afterward, infectious diseases transmitted during a transfusion may go undetected until days, weeks, or months later, when signs and symptoms appear.

A transfusion reaction requires immediate recognition and prompt nursing action to prevent further complications and, possibly, death—particularly if the patient is unconscious or so heavily sedated that he can't report the common symptoms. (See *Guide to transfusion reactions,* pages 748 and 749.)

Equipment

Gloves normal saline solution IV administration set sterile urine specimen container supplies for blood collection (see "Venipuncture," page 781) transfusion reaction report form stethoscope blood pressure cuff pulse oximeter thermometer laboratory specimen labels laboratory request form laboratory biohazard transport bags Optional: oxygen, epinephrine, hypothermia blanket, leukocyte removal filter.

Implementation

- Perform hand hygiene.
- Confirm the patient's identity using at least two patient identifiers according to your facility's policy.
- As soon as you suspect an adverse reaction, stop the transfusion and notify the doctor and the blood bank.
- Prepare a normal saline infusion using a new macrodrip IV administration set.

(Text continued on page 750.)